

REMARKS

Claim 4 has been amended to include a recitation for X₁ in accordance with the definition of formulae Ib and Ic on page 5 of the present invention. Since the compound of formula Id is a preference of formula Ib, the definition of X₁ given for formula Ib also supports this definition for formula Id.

Entry of the above amendment is respectfully requested.

Rejoinder Issue

On page 2 of the Office Action, the Examiner indicates that in the event that the composition claims are found allowable, the method of using an allowable composition can be rejoined.

Applicants thank the Examiner for this indication in regard to non-elected method claim 12. With respect to non-elected composition claims 10 and 11, Applicants submit that in the event that the elected composition claims are found allowable, non-elected composition claims 10 and 11 including an allowable composition can also be rejoined in view of the provisions of MPEP 821.04(a). Accordingly, rejoinder of the non-elected claims upon a finding that the elected composition claims are found allowable is respectfully requested per MPEP 821.04(a) and MPEP 821.04(b).

Rejection under 35 USC 112, Second Paragraph

On page 2 of the Office Action, in paragraph 3, claims 2 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite.

The Examiner's Position

Based on the reasons given by the Examiner, the Examiner's position is as follows.

- (1) Claim 2 recites the limitation "photopolymerizable group" according to claim 1, but there is insufficient antecedent basis for this limitation in the claim 1.
- (2) Regarding claim 4, the Examiner asks what the definition of X_1 is.

Applicants' Response

In response to the issues raised by the Examiner, Applicants have the following comments.

- (1) With respect to the first issue raised by the Examiner, Applicants note initially that claim 1 recites as follows:

“1. Composition comprising

- a) at least one ethylenically unsaturated monomer to which a **photochemically isomerizable or dimerizable molecule ...**”

Applicants submit that a **photochemically isomerizable or dimerizable molecule** is a generic expression encompassing the photopolymerizable subgroup. For example, a material which is photochemically dimerizable has specific dimerizable group.

This dimerization can lead to a polymer. Hence, the wording “photochemically dimerizable groups” encompasses “photopolymerizable groups”.

Therefore, Applicants submit that claim 2 fulfills the requirements under 35 USC 112, second paragraph.

- (2) As to the second issue raised by the Examiner, since X_1 is amended Applicants submit that the Examiner's requirement has been fulfilled.

Accordingly, Applicants submit that the present claims satisfy the requirements of 35 U.S.C. 112, second paragraph, and withdrawal of this rejection is respectfully requested.

Obviousness Rejection

On page 3 of the Office Action, in paragraph 7, claims 1-9 and 13-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Herr et al. (US-427 or US-087) or Gibbons et al. (US-404).

Applicants respectfully submit that the present invention is not obvious over the cited art, and request that the Examiner reconsider and withdraw this rejection in view of the following remarks.

Concerning US-6,107,427

Herr et al describes

- a polymer (I) with a side chain, which can comprise a naphthalene group (see column 3, lines 30 to 37 and example 8 of US-427), and
- further copolymers having
 - monomer units as described in column 5, lines 52 to 61 and column 6, lines 1 to 9, or
 - further structures of polymer (I).

There is no teaching in US-427 about any sensitizer.

Even if a naphthalene group is used in polymer (I), there is no teaching in US-427 that this naphthalene has the efficacy of a sensitizer. At the filing date of US-427 naphthalene was known as a sensitizer only when it was administered in a mixture with a photoreactive compound.

This is in contrast to the present invention, wherein the sensitizer is covalently bonded to the copolymer.

A skilled person starting with the teaching of US-427 could therefore not arrive at the copolymers of the present invention since US-427 does not teach copolymers having covalently bonded sensitizers.

The naphthalene group in polymer (I) of US-427 functions only as a building block for providing a polymer structure, which gives access to orientation abilities of liquid crystals.

Hence, the present invention is non-obvious over the teaching of US-427, and Applicants submit that any other opinion can only arise from forbidden hindsight.

Concerning US-6,201,087 and the combination of this teaching with US-6,107,427

US-087 describes

- copolymer having one monomer unit comprising a coumarin group (see example 8).

In contrast to the present invention, there is no copolymer disclosed having both components a) and b) of claim 1 of the present invention.

A skilled person could however never arrive at the copolymers of the present invention, since he had to replace the second side chain either by

- an ethylenically unsaturated monomer to which a sensitizer is covalently bonded, or
- an ethylenically unsaturated monomer to which a photochemically isomerizable or dimerizable molecule is covalently bonded.

However, a skilled person would not be motivated to change the copolymer of example 8 of US-087, since there is no teaching in US-087 to do so.

Further, there is no teaching in US-087 that coumarin is used as a sensitizer. Indeed, there is no teaching of using any sensitizer. In the absence of any hint for using a sensitizer,

Applicants submit that it can only arise from forbidden hindsight that coumarin is used as a sensitizer.

Instead, coumarin is used in the present invention for building up the polymer and arriving at polymers “which are capable of producing high resolution orienting patterns and which lead to more stable orienting structures for liquid crystalline materials” (see US-087, column 1, lines 54 to 57).

Also, by combining the teachings of US-427 and US-087, a skilled person would not arrive to the present invention, since both references do not teach a sensitizer and their covalent linkage to a copolymer.

Therefore, Applicants submit that the present invention is non-obvious over the teaching of US-087 and the combination of the teachings US-087 combined with US-427,

Concerning US-6,919,404 and the combination of this teaching with US-6,107,427 and/or US-6,201,487

US-404 describes

- tetracarboxylic dianhydrides of naphthalenes and polyimides built up from them.

However, there is no teaching in US-404 that a sensitizer has to be added or incorporated in the monomer or polymer structures. The naphthalene group is used in US-404 for forming the polyimide. No other efficacy is described in US-404, and even less there is no teaching that naphthalene or coumarin shows in their covalently bonded form any sensitizing efficacy. Again, Applicants submit that such an opinion can only arise from forbidden hindsight.

Hence, a skilled person seeking to provide polymers which have accelerated photoreaction would not have used the teachings of US-404, and even if he would have used this

teaching, he would not have arrived at the present invention, because no hint is provided for using a covalently bonded sensitizer.

Therefore, Applicants submit that the present invention is non-obvious over the teachings of US-404 and the combination of US 404 with the teachings US-087 and/or US-427.

Thus, reconsideration and withdrawal of this rejection is respectfully requested.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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